

PERFORMANCE REPORT

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FEDERAL AID PROJECT F-221-M-4

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2013 Fisheries Management Survey Report

Martin Creek Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Martin Creek Reservoir were surveyed in 2013 using electrofishing and in 2014 using gill netting. Anglers were surveyed from December 2013 through February 2014 with a creel survey. Historical data are presented with the 2013-2014 data for comparison. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir Description:** Martin Creek Reservoir is located on Martin Creek, a tributary of the Sabine River in Rusk County. Luminant Energy impounded the reservoir in 1974 to provide cooling water for their coal-powered generators. At conservation pool, Martin Creek Reservoir is 4,981 surface acres with a shoreline length of 62 miles, and a mean depth of 16 feet. Water level fluctuations average 3 to 5 feet annually.
- **Management History:** The management plan from the 2009 survey report included working in conjunction with Martin Creek State Park and Luminant Energy to prevent additional introductions of giant salvinia. Additionally, annual aquatic vegetation surveys were recommended to ensure that a rapid response could occur if giant salvinia was reintroduced. State Park personnel have been vigilant in inspecting boat trailers, and aquatic vegetation surveys have not documented giant salvinia since 2009. Triploid grass carp were stocked from 1996 through 1999 at a rate of 0.6/acre each year to reduce hydrilla that covered about a third of the reservoir. Aquatic vegetation was introduced in 2012 and brushpiles were introduced in 2014.
- **Fish Community**
 - **Prey species:** Primary prey species were Gizzard Shad, Threadfin Shad, and Bluegill. Catch rates and body condition of both Blue Catfish and Largemouth Bass suggested that these prey species provided ample forage for predator species.
 - **Catfishes:** Channel Catfish abundance decreased significantly over the last three survey years. Blue Catfish fingerlings were stocked in 2003 and 2007. Although gill net data indicated good survival, excellent growth, and natural recruitment of Blue Catfish, the popularity of the fishery declined, accounting for only 8.9% of the directed angling effort in the winter of 2013/2014 compared to 23.6% directed effort in the spring of 2002. However, this observed decline may be due to the difference in creel survey seasons.
 - **Largemouth Bass:** Largemouth Bass provided the most popular fishery during the winter quarter of 2013/2014 (90.3% of total angling effort). Largemouth Bass abundance and size structure was moderate and stable over the last three electrofishing surveys, and fish were in moderate body condition.
 - **Crappies:** Only Black Crappie was observed during the winter quarter 2013/2014 creel survey. Total angling effort directed towards crappies was < 1% with only 214 fish reported as caught (69 were harvested).
- **Management Strategies:** Giant salvinia was discovered in 2009. Inland Fisheries staff has advised park personnel regarding plant identification and transport potential via boat trailers. Vegetation surveys will be conducted annually to monitor giant salvinia. Currently, there is little aquatic vegetation present. When vegetation reestablishes, Inland Fisheries staff will advise the controlling authority on vegetation control. In coordination with State Park staff, additional brushpiles will be introduced.

INTRODUCTION

This document is a summary of fisheries data collected from Martin Creek Reservoir in 2013 and 2014. The purpose of this document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other species of fishes was collected, this report deals primarily with major sport fishes and important prey species. Past survey data are presented with the 2013 and 2014 data for comparison.

Reservoir Description

Martin Creek Reservoir was impounded in 1974 on Martin Creek. It is located in Rusk County approximately 10 miles northeast of Henderson and is operated and controlled by Luminant Energy to provide cooling water for their coal-powered generators. At conservation pool, Martin Creek Reservoir is 4,981 surface acres in size, has a shoreline length of 62 miles, and a mean depth of 16 feet. Water level fluctuations average three to five feet annually, but the reservoir was over 10 feet below conservation pool during 2011 (Figure 1). The primary habitat type is standing timber. Most of the land around the reservoir is used for agriculture and oil and gas production. Other descriptive characteristics for Martin Creek Reservoir are presented in Table 1.

Angler Access

Martin Creek Reservoir has a public boat ramp and one handicap-accessible fishing pier present at Martin Creek State Park, and a private ramp located on Luminant Energy property. Both ramps were unavailable to anglers in 2011 due to low water levels. Additional boat ramp characteristics are in Table 2. Shoreline access is limited to Martin Creek State Park and from the causeways that cross the reservoir.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Ashe and Driscoll 2009) included:

1. Continue to encourage state park personnel to inspect all boat trailers.
Action: State park personnel have been vigilant in regards to inspecting incoming boat trailers for giant salvinia.
2. In conjunction with AHE staff and Luminant Energy, conduct annual vegetation surveys to monitor giant salvinia coverage, and use all applicable means of control (booms, herbicides, and weevils).
Action: Annual vegetation surveys have been conducted with no giant salvinia detected since June 2009.
3. Coordinate with Luminant Energy and introduce water willow in areas that will not interfere with industrial activities in order to increase total vegetative coverage.
Action: Aquatic vegetation was introduced in 2012 with limited success.
4. Continue to assist state park personnel with placement of brushpiles in the reservoir.
Action: Inland fisheries staff and state park staff worked collaboratively to introduce brushpiles into the reservoir in 2014.

Harvest regulation history: Sport fishes in Martin Creek Reservoir are currently managed with statewide regulations (Table 3).

Stocking history: Blue Catfish were stocked in 2003 (273,789 fingerlings) and 2007 (249,050 fingerlings). Approximately 3,000 triploid Grass Carp were stocked annually from 1996 through 1999. The complete stocking history is in Table 4.

Vegetation/habitat management history: The controlling authority stocked triploid Grass Carp in 1993, and 1996 through 1999 to reduce hydrilla that had become problematic. The reservoir had nearly 35% hydrilla coverage prior to the triploid Grass Carp stockings. Giant salvinia was discovered in June 2009 and has not been detected since that time. Aquatic vegetation (water willow, stargrass, and Illinois pondweed) was introduced in 2012 with limited success.

Water transfer: There is no interbasin transfer associated with the operation of Martin Creek Reservoir. Martin Creek Reservoir does have the ability to pump water from the Sabine River when needed, and water is released through the dam to maintain flow downstream and to manage pool elevation.

METHODS

Fishes were collected by electrofishing (1.0 hour at 12, 5-min stations in October 2013) and gill netting (5 net nights at 5 stations conducted in February 2014). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and for trap nets and gill nets as the number of fish caught per net night (fish/nn). All survey sites were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2011).

An access survey was conducted in November 2013 by physical inspection of available boat ramps (TPWD, Inland Fisheries Division, unpublished manual revised 2011).

A roving creel survey was conducted from December 2013 through February 2014. Angler interviews were conducted on 5 weekend days and 4 weekdays to assess angler use and fish catch/harvest statistics in accordance with the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2011).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD), terminology modified by Guy et al. 2007], and condition indices [relative weight (W_r)] were calculated for target fishes according to Anderson and Neumann (1996). Index of Vulnerability (IOV) was calculated for Gizzard Shad (DiCenzo et al. 1996). Standard error (SE) was calculated for structural indices and IOV. Relative standard error ($RSE = 100 \times SE$ of the estimate/estimate) was calculated for all CPUE and creel statistics. Ages were determined using otoliths from 13 Largemouth Bass from 13.5 to 14.5 inches in length.

Genetic analysis of Largemouth Bass was conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2011). Micro-satellite DNA analysis was used to determine genetic composition of individual fish.

Source for water level data was the United States Geological Survey web site (USGS 2014).

RESULTS AND DISCUSSION

Habitat: The habitat survey conducted in 2005 indicated the littoral zone consisted primarily of overhanging brush, concrete, and standing timber (Ashe and Driscoll 2005). Over 2,400 acres of standing dead timber was present. Vegetation consisted of American lotus and cattail (Table 5).

Giant salvinia was discovered in 2009 in one embayment of the reservoir. Luminant Energy immediately isolated the infestation with containment booms and manually removed all visible plants. Cold water temperatures (< 10 deg C) during the winter of 2010 likely reduced plant coverage as well. No plants have been observed since 2009.

Creel: Directed fishing effort was highest for Largemouth Bass (90.3%), followed by catfishes (8.9%), and crappies (0.8%) (Table 6). Total fishing effort for all species was 17,835.6 h and estimated direct expenditures were \$148,823 (Table 7). In 2002, proportions of directed effort

towards Largemouth Bass and catfishes were 29.6% and 23.6%, respectively. However, during the 2009/2010 and 2013/2014 surveys, over 85.5% of total effort was directed at Largemouth Bass with low directed effort towards catfishes. It is unclear whether the observed trends in fishing effort were due to changes in angler preference or to the different months surveyed.

Prey species: Electrofishing catch rates of Gizzard Shad and Bluegill were 31.0/h and 423.0/h, respectively in 2013 (Figures 2 and 3). Index of Vulnerability (IOV) for Gizzard Shad was high (55.0) and increased from the 2009 survey (Figure 2). Total CPUE and size structure of Bluegill in 2013 was similar to previous surveys (Figure 3). Threadfin Shad were present in the reservoir; electrofishing catch rate was 35.0/h (Appendix A). Prey availability appears to be adequate, given moderate body condition of sport fish and growth rates of Largemouth Bass.

Catfishes: The gill net catch rate of Blue Catfish was 20.8/nn in 2014, an increase from 2009 (11.2/nn) and 2006 (3.9/nn) (Figure 4). Catch rates and size structure indices suggest that Blue Catfish have experienced adequate survival and growth from the 2003 and 2007 stocking, and possibly natural recruitment.

The gill net catch rate of Channel Catfish was 10.0/nn in 2014, which was lower than what was observed in 2009 (17.5/nn) and 2006 (29.8/nn) (Figure 5). Low relative weights and the decrease in CPUE may reflect competition for prey (intraspecific and interspecific with introduced Blue Catfish). Age data in 2009 and 2010 indicated poor growth. In 2009, fish reached 10 inches at age 3 and 12 inches at age 5. In 2010, age-4 fish averaged only 10.2 inches.

Despite introducing Blue Catfish with the intent to expand catfish angling and harvest opportunities, directed angler effort declined substantially from 2002 (8,077.0 h) to 2013/2014 (1,584.9 h) (Table 8). Overall catfish harvest also declined from 9,673 fish (2002) to 759 fish (2013/2014) (Table 8; Figures 6 and 7). Again, observed declines associated with the catfish fishery could be due to differences in months sampled.

Largemouth Bass: The electrofishing catch rate of Largemouth Bass in 2013 (183.0/h) significantly increased from what was observed in 2005 and 2009 (109.3/h and 108.0/h, respectively) (Figure 8). Higher water levels in 2012 and 2013 resulted in inundated terrestrial vegetation and increased recruitment. Size structure was moderate with a PSD value of 27. Relative weights exceeded 80 indicating Largemouth Bass were in moderate condition. Growth of Largemouth Bass was rapid; average age at 14 inches (13.5 - 14.5 inches) was 1.7 years ($N = 13$; range = 1 – 3 years). Florida Largemouth Bass influence has remained relatively constant, as Florida alleles ranged from 59.0% to 65.4% (Table 10).

All creel survey statistics for Largemouth Bass were similar during the last two survey periods. From December 2013 through February 2014, directed fishing effort, catch per hour, and total harvest for Largemouth Bass was 16,110 h, 1.8 fish/h, and 1,632 fish, respectively (Table 9). A total of 40.0% of all directed effort for Largemouth Bass was tournament-related (Table 6). The majority of fish caught by anglers above the 14-inch minimum length size limit were released (74.7%), and harvested fish ranged in length from 14 to 22 inches (77.5% tournament-retained) (Table 9; Figures 9 and 10). Largemouth Bass catch by weight categories was similar during the last two creel surveys. The proportion of total catch for fish 4 to 6.9 pounds ranged from 0.8 to 1.4% (Table 9).

Crappies: Standard trap net surveys were discontinued in 2001, due to gear inefficiency. The 2013/2014 creel survey indicated directed effort for crappies was only 140.5 hours, with 69 Black Crappie harvested (Table 11; Figure 11).

Fisheries management plan for Martin Creek Reservoir, Texas

Prepared – July 2014.

ISSUE 1: Although a reservoir-wide survey during the summer of 2013 documented no plants, the threat for additional introduction of giant salvinia via boat trailers is high.

MANAGEMENT STRATEGIES

1. Continue to encourage state park personnel to inspect all boat trailers.
2. In conjunction with AHE staff and Luminant Energy, conduct annual vegetation surveys to monitor giant salvinia coverage, and use all applicable means of control (booms, herbicides, and weevils).

ISSUE 2: There is little aquatic vegetation present in the reservoir due to the combination of triploid Grass Carp stockings (1996 through 1999) and low water levels in 2005/2006 and 2011/2012. Increasing aquatic vegetation coverage would likely improve recruitment of Largemouth Bass, which supports the most popular fishery at the reservoir.

MANAGEMENT STRATEGIES

1. Conduct vegetation surveys annually to monitor the status of vegetation in the reservoir. In the future, if hydrilla reestablishes, consult with Luminant Energy and the state park to develop a vegetation management plan that balances industrial and recreational uses.
2. Coordinate with Luminant Energy and introduce water willow in areas that will not interfere with industrial activities in order to increase total vegetative coverage.
3. Continue to assist state park personnel with placement of brushpiles in the reservoir.

ISSUE 3: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches and plugging engine cooling systems. Giant salvinia and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing, and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

MANAGEMENT STRATEGIES

1. Cooperate with the controlling authority to post appropriate signage at access points around the reservoir.
2. Contact and educate marina owners about invasive species, and provide them with posters, literature, etc... so that they can in turn educate their customers.
3. Educate the public about invasive species through the use of media and the internet.
4. Make a speaking point about invasive species when presenting to constituent and user groups.
5. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule includes annual vegetation surveys and fall electrofishing, gillnetting, and angler access and creel surveys in 2017/2018 (Table 12).

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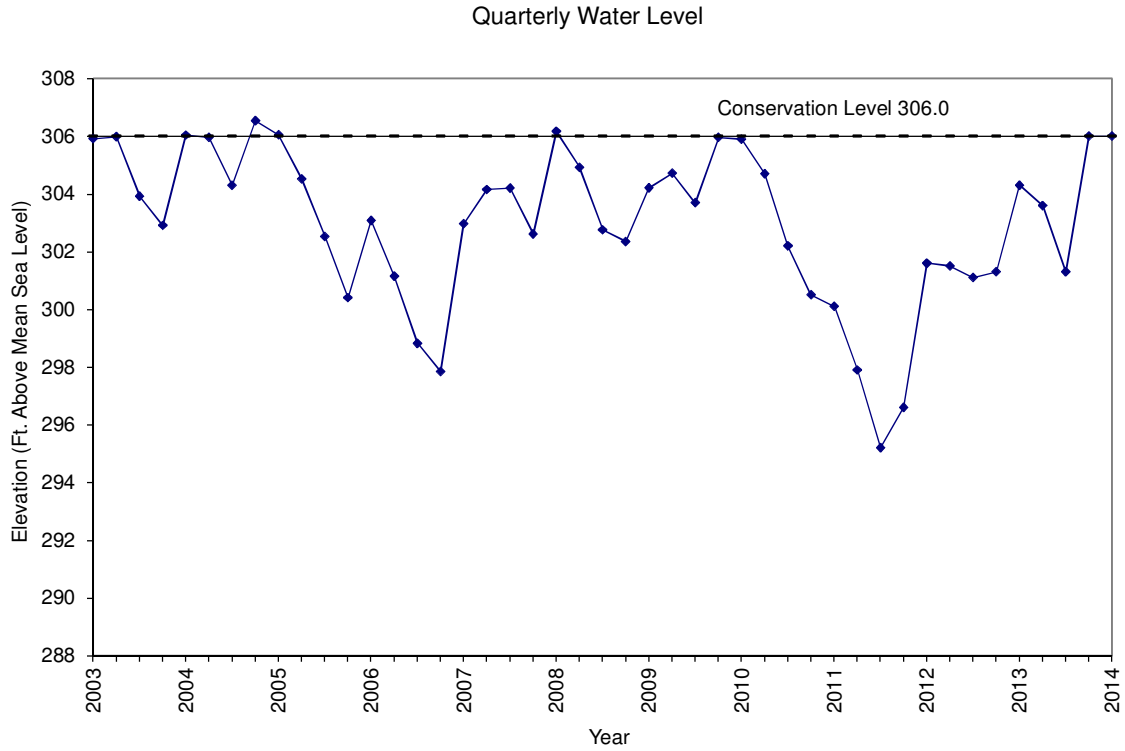


Figure 1. Quarterly water level elevations in feet above mean sea level (MSL) recorded for Martin Creek Reservoir, Texas.

Table 1. Characteristics of Martin Creek Reservoir, Texas.

Characteristic	Description
Year constructed	1974
Controlling authority	Luminant Energy
Counties	Rusk
Reservoir type	Secondary stream
Shoreline Development Index (SDI)	4.7
Conductivity	120 umhos/cm

Table 2. Boat ramp characteristics for Martin Creek Reservoir, Texas, November, 2013.
Reservoir elevation at time of survey was 306 feet above mean sea level.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
State Park	32.27379 -94.56583	Y	50	302	No access issues
Luminant Energy	32.26949 -94.58557	N	20	301	No access issues

Table 3. Harvest regulations for Martin Creek Reservoir.

Species	Bag limit	Length limit
Catfishes: Channel and Blue Catfish, their hybrids and subspecies	25 (in any combination)	12-inch minimum
Catfish, Flathead	5	18-inch minimum
Bass, Largemouth	5	14-inch minimum
Crappies: White and Black Crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

Table 4. Stocking history of Martin Creek Reservoir, Texas. FGL = fingerling; AFGL = advanced fingerling; ADL = adults; UNK = unknown.

Species	Year	Number	Size
Blue Catfish	1974	81,520	UNK
	1982	600	UNK
	1984	100,758	FGL
	1985	50,062	FGL
	2003	273,789	FGL
	2004	200	ADL
	2007	249,050	FGL
	Total	755,979	
Channel Catfish	1973	15	UNK
	1974	100,888	AFGL
	Total	100,903	
Florida Largemouth Bass	1974	365,000	FRY
	1984	559,970	FGL
	1990	251,357	FRY
	Total	1,176,327	
Palmetto Bass	1974	49,880	UNK
	1975	15,000	UNK
	1983	49,800	UNK
	1984	99,875	FGL
	Total	214,555	
Redbreast Sunfish	1983	346,853	
	1984	404,236	
	Total	751,089	
Walleye	1974	1,250,676	FRY
	Total	1,250,676	
White Crappie	1983	30,913	UNK
	1984	134,227	FGL
	1986	91,696	FRY
	Total	256,836	

Table 5. Survey of aquatic vegetation, Martin Creek Reservoir, Texas, 2001, 2005, 2009, and 2013. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Species	2001	2005	2009	2013
American lotus	4 (<1)	10 (<1)	5 (< 1)	109 (2.2)
<i>Potamogeton spp.</i>	0 (0)	0 (0)	5 (< 1)	5 (<1)
Cattail	0 (0)	0 (0)	0 (0)	195 (3.9)
Giant salvinia (Tier I)*	0 (0)	0 (0)	<1 (< 1)	0 (0)

*Tier I is immediate response.

Table 6. Percent directed angler effort by species or groups for Martin Creek Reservoir, Texas, February through April 2002, December 2009 through February 2010, and December 2013 through February 2014. For largemouth bass, the percentage of tournament angler effort is in parentheses.

Species/Groups	2002	2009/2010	2013/2014
Largemouth Bass	29.6	85.5 (50.5)	90.3 (40.0)
Catfishes	23.6	5.9	8.9
Crappies	21.8	5.2	0.8
Panfishes	2.0	0.0	0.0
Anything	22.3	3.4	0.0

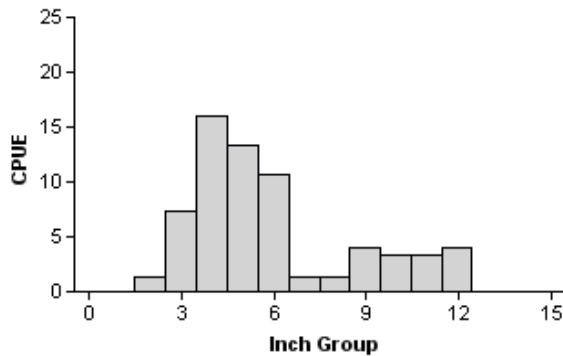
Table 7. Total fishing effort (h) for all species and total directed expenditures at Martin Creek Reservoir, Texas, February to April 2002, December 2009 to February 2010, and December 2013 to February 2014. Relative standard error is in parentheses.

Creel statistic	2002	2009/2010	2013/2014
Total fishing effort	27,261.0 (NA)	23,121.1 (37)	17,835.6 (40)
Total directed expenditures	\$95,500 (NA)	\$140,045 (41)	\$148,823 (51)

Gizzard Shad

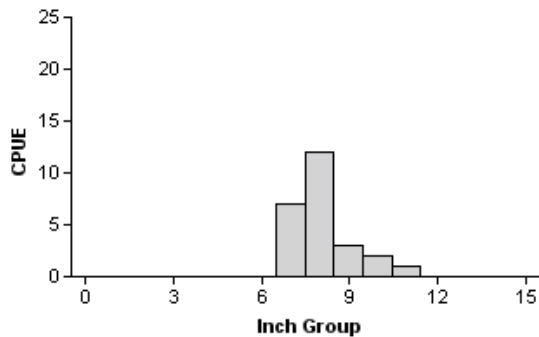
2005

Effort = 1.5
Total CPUE = 66.0(23;99)
IOV = 76 (8)



2009

Effort = 1.0
Total CPUE = 25.0 (32; 25)
IOV = 28 (9.3)



2013

Effort = 1.0
Total CPUE = 31.0 (28; 31)
IOV = 55 (10.4)

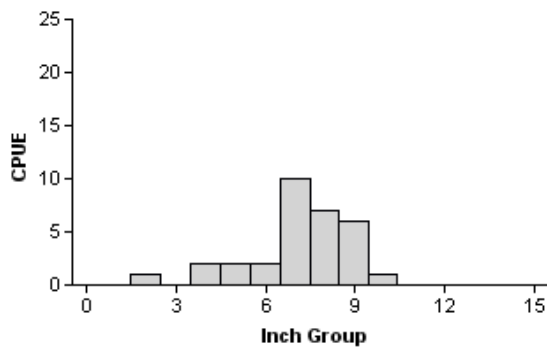


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Martin Creek Reservoir, Texas, 2005, 2009, and 2013.

Bluegill

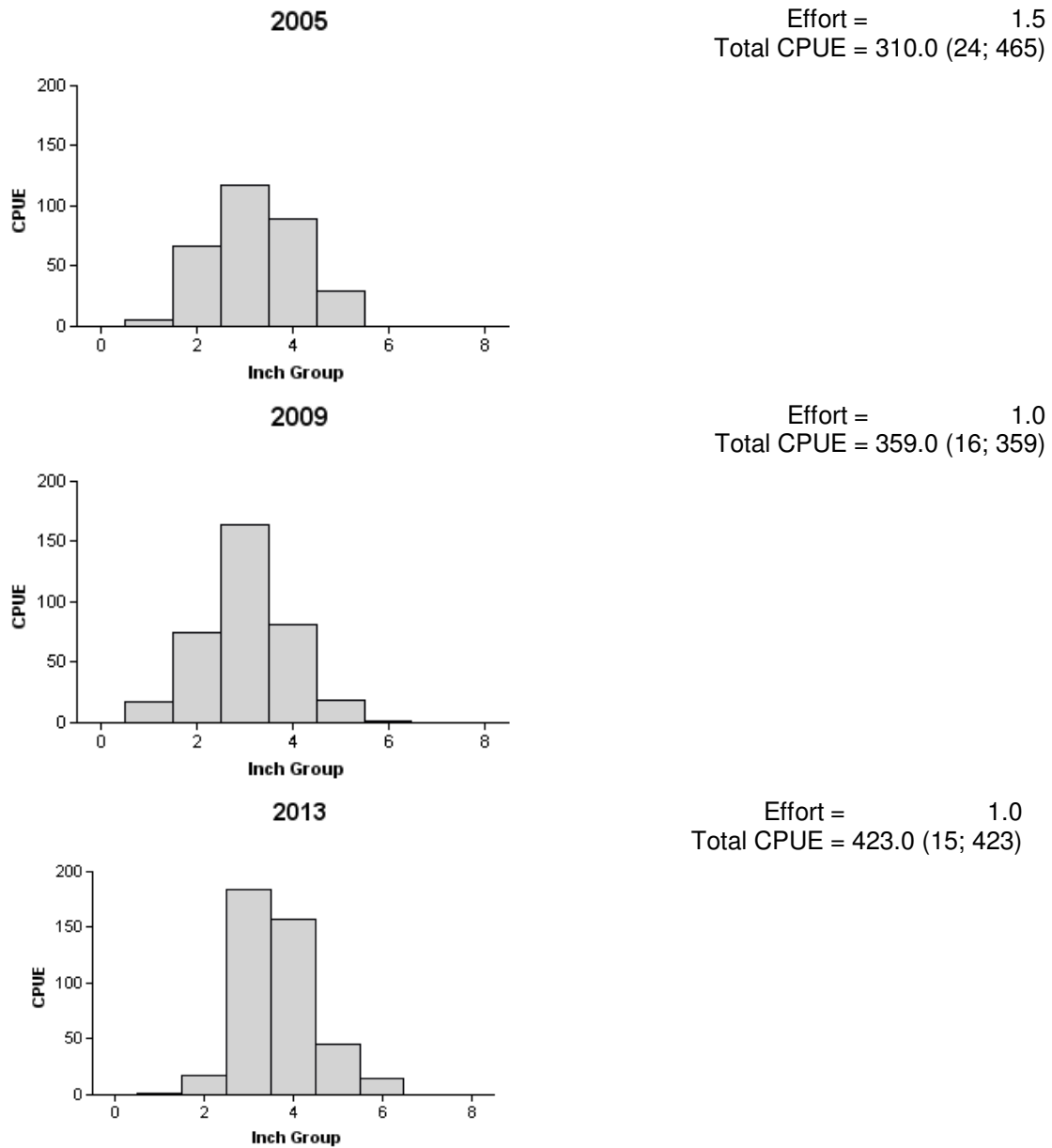


Figure 3. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE are in parentheses) for fall electrofishing surveys, Martin Creek Reservoir, Texas, 2005, 2009, and 2013.

Blue Catfish

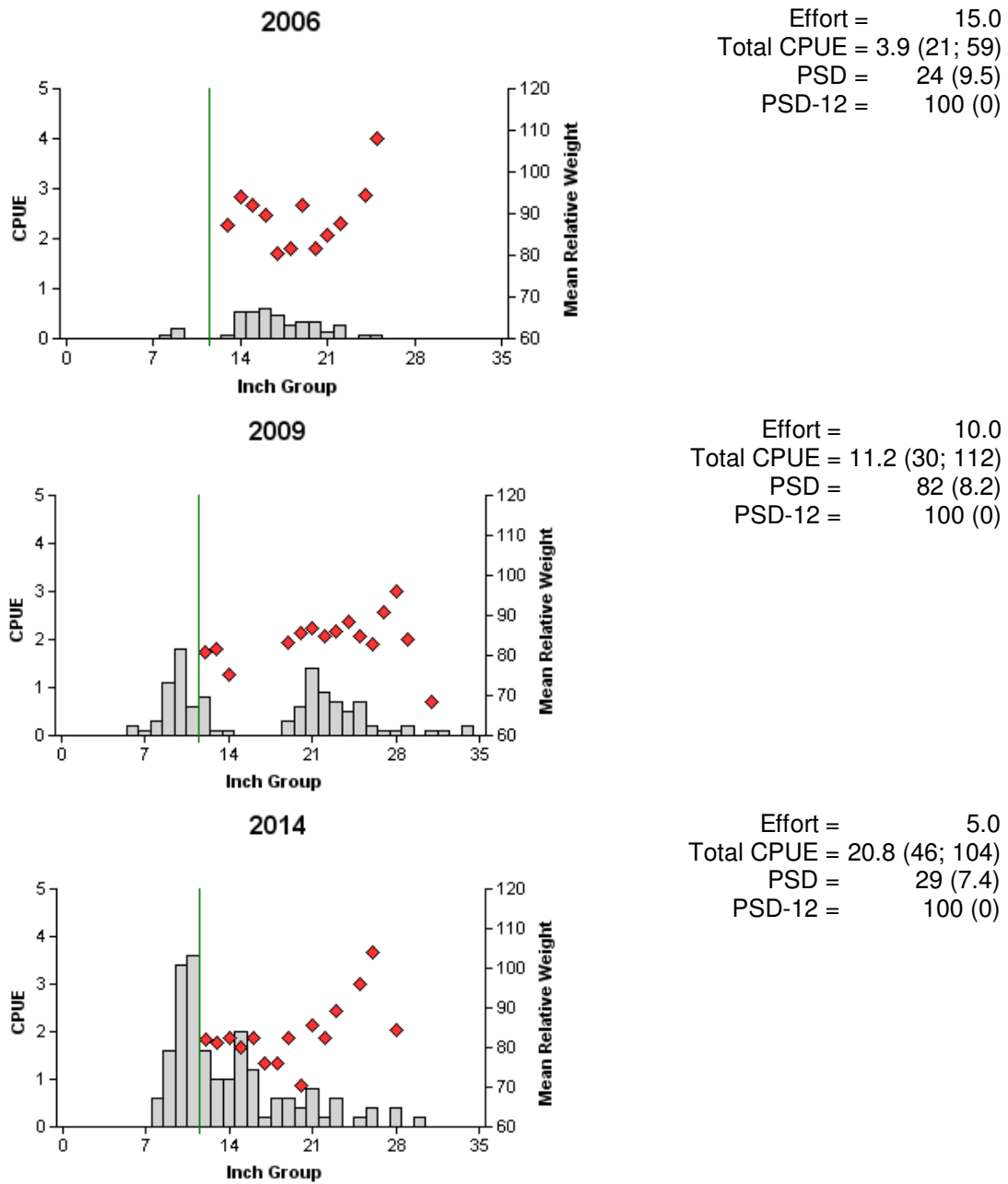


Figure 4. Number of Blue Catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Martin Creek Reservoir, Texas, 2006, 2009, and 2014.

Channel Catfish

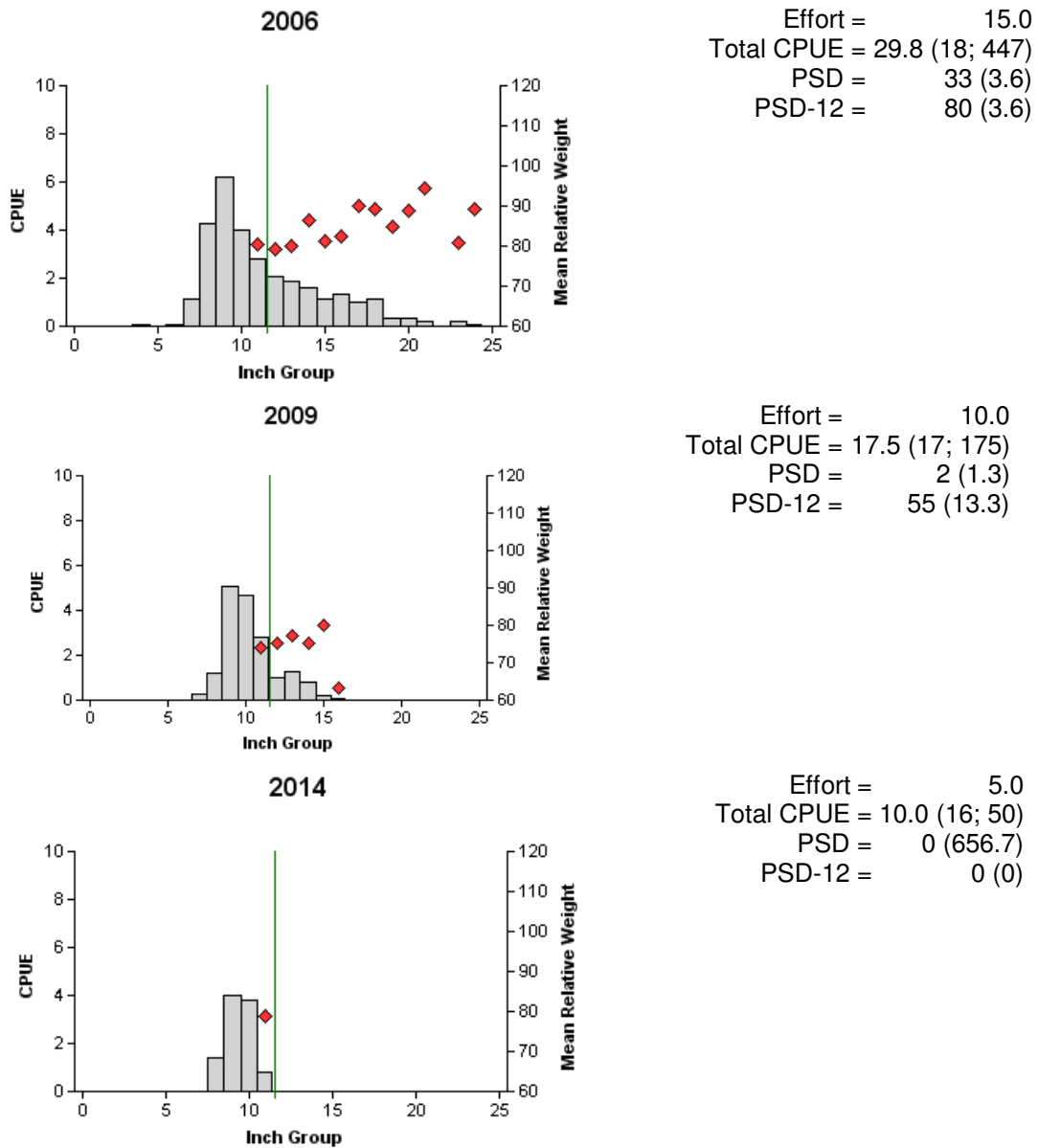


Figure 5. Number of Channel Catfish caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for spring gill net surveys, Martin Creek Reservoir, Texas, 2006, 2009, and 2014.

Catfishes

Table 8. Creel survey statistics for catfishes at Martin Creek Reservoir from February through April 2002, December 2009 through February 2010, and December 2013 through February 2014. Total catch per hour is for anglers targeting catfishes and total harvest is the estimated number of catfishes harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	2002	2009/2010	2013/2014
Directed effort (h)	8,077.0 (30)	1,364.7 (52)	1,584.9 (42)
Directed effort/acre	1.6 (30)	0.3 (52)	0.3 (42)
Total catch per hour	1.2 (29)	0.1 (110)	0.7 (46)
Total harvest	9,672.5 (54)	30.0 (491)	758.7 (100)
Channel Catfish harvest	9,672.5 (54)	0.0	229.9 (123)
Blue Catfish harvest	0.0	30.0 (491)	528.8 (89)
Harvest/acre	1.9 (54)	0.01 (491)	0.15 (100)
Percent legal released	0.0	0.0	12.5

Catfishes

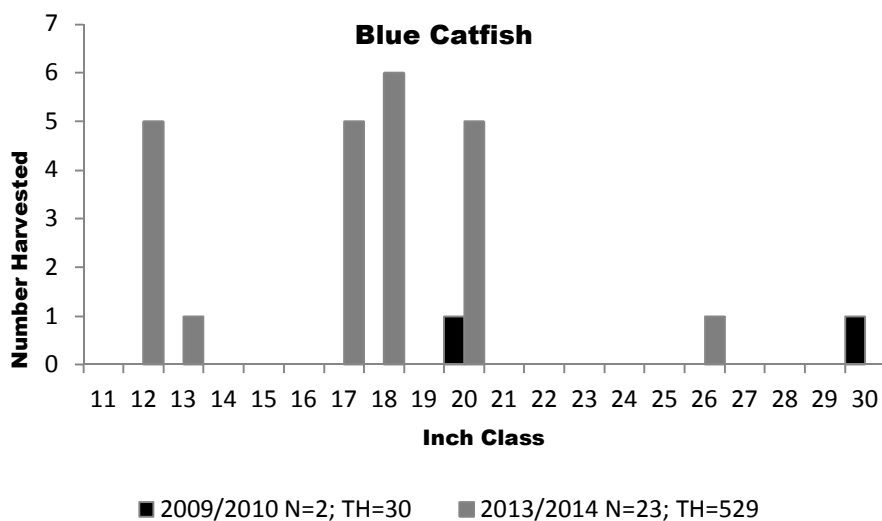


Figure 6. Length frequency of harvested Blue Catfish observed during creel surveys at Martin Creek Reservoir, Texas, December 2009 through February 2010, and December 2013 through February 2014, all anglers combined. N is the number of harvested Blue Catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

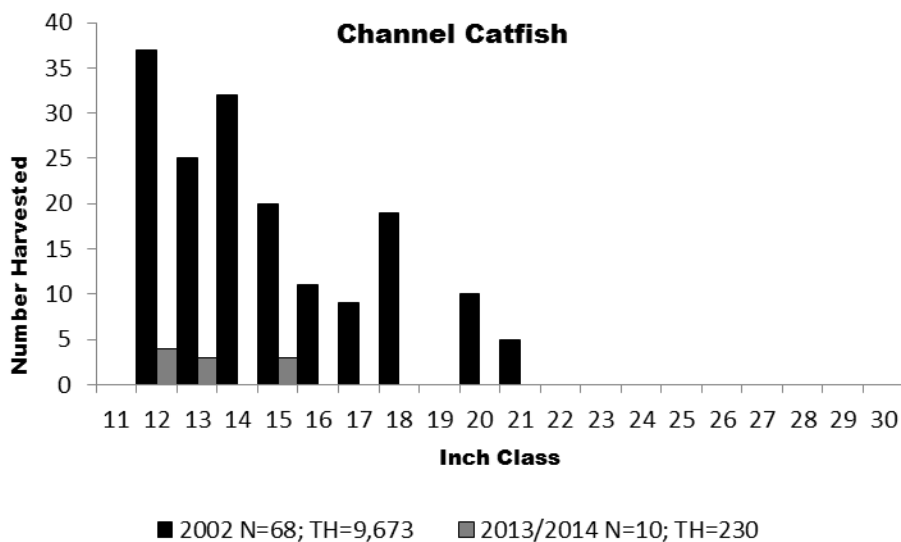
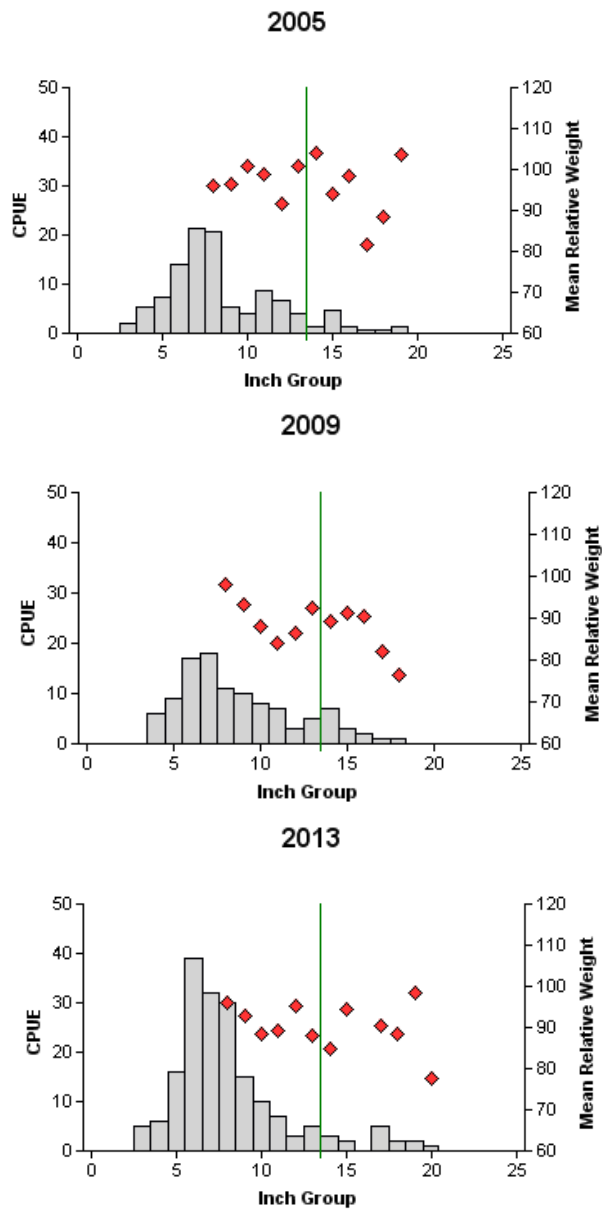


Figure 7. Length frequency of harvested Channel Catfish observed during creel surveys at Martin Creek Reservoir, Texas, February through April 2002, and December 2013 to February 2014, all anglers combined. N is the number of harvested Channel Catfish observed during creel surveys, and TH is the total estimated harvest for the creel period.

Largemouth Bass



Effort = 1.5
 Total CPUE = 109.3 (12; 164)
 PSD = 35 (4.9)

Effort = 1.0
 Total CPUE = 108.0 (18; 108)
 PSD = 38 (7.7)

Effort = 1.0
 Total CPUE = 183.0 (15; 183)
 PSD = 27 (7.4)

Figure 8. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Martin Creek Reservoir, Texas, 2005, 2009, and 2013.

Largemouth Bass

Table 9. Creel survey statistics for Largemouth Bass at Martin Creek Reservoir from February through April 2002, December 2009 through February 2010, and December 2013 through February 2014. Catch rate is for all anglers targeting Largemouth Bass. Harvest is partitioned by the estimated number of fish harvested by non-tournament anglers and the number of fish retained by tournament anglers for weigh-in and release. The estimated number of fish released by weight category is for anglers targeting Largemouth Bass. Relative standard errors (RSE) are in parentheses.

Statistic	2002	2009/2010	2013/2014
Directed angling effort (h)			
Tournament	NA	9,402 (38)	6,440 (45)
Non-tournament	NA	10,367 (35)	9,670 (43)
All black bass anglers combined	6,435.8 (36)	19,769 (35)	16,110 (42)
Angling effort/acre	1.2 (36)	4.0 (35)	3.2 (42)
Catch rate (number/h)	0.4 (29)	1.5 (11)	1.8 (17)
Harvest	1,039 (174)		
Non-tournament harvest	NA	585 (46)	368 (83)
Harvest/acre	0.2 (174)	0.4 (44)	0.1 (83)
Tournament weigh-in and release	NA	1,468 (48)	1,264 (80)
Total catch	NA	31,103	33,942
< 4.0 lbs	NA	30,826 – 99.1%	33,471 – 98.6%
≥ 4–6.9 lbs	NA	240 – 0.8%	471 – 1.4%
≥ 7–9.9 lbs	NA	37 – 0.1%	0 – 0.0%
≥ 10 lbs	NA	0 – 0.0%	0 – 0.0%
Percent legal released (non-tournament)	< 1.0	84	90

Largemouth Bass

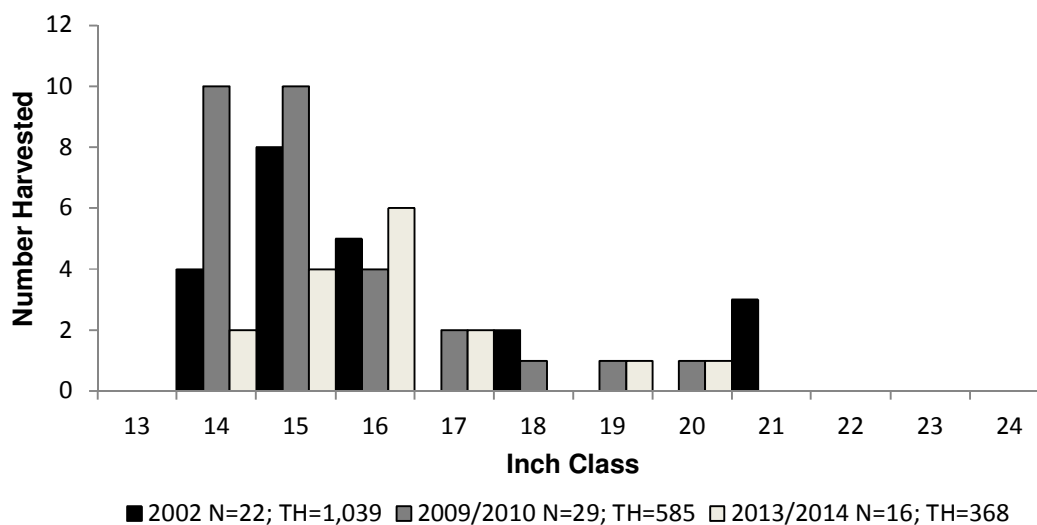


Figure 9. Length frequency of non-tournament harvested Largemouth Bass observed during creel surveys at Martin Creek Reservoir, Texas, from February through April 2002, December 2009 through February 2010, and December 2013 through February 2014, all anglers combined. N is the number of harvested largemouth bass observed during creel surveys, and TH is the total estimated harvest for the creel period. During 2002, harvested fish were not segregated by tournament and non-tournament angling.

Largemouth Bass

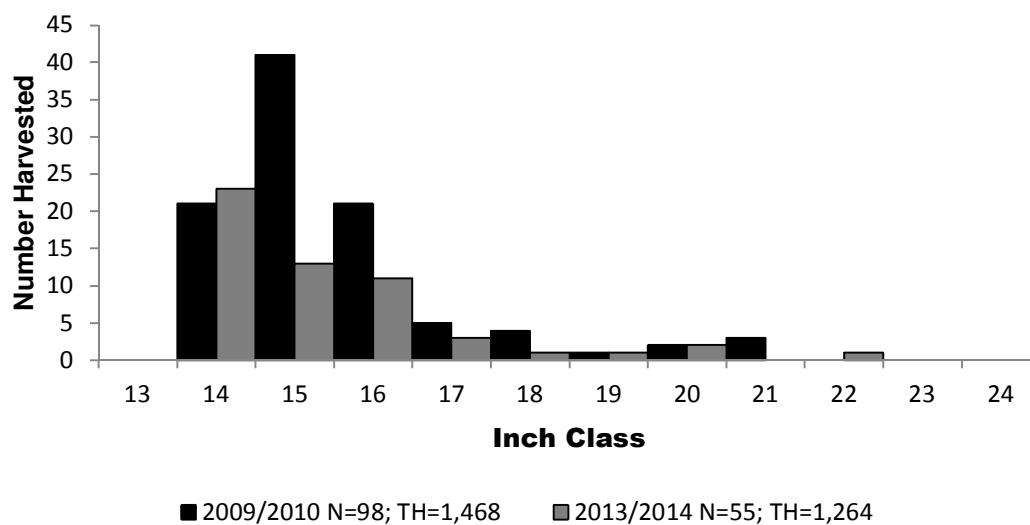


Figure 10. Length frequency of tournament harvested Largemouth Bass observed during creel surveys at Martin Creek Reservoir, Texas, from December 2009 through February 2010, and December 2013 through February 2014, all anglers combined. N is the number of harvested largemouth bass observed during creel surveys, and TH is the total estimated harvest for the creel period.

Largemouth Bass

Table 10. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Martin Creek Reservoir, Texas, 2005, 2009, and 2013. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, Intergrade = hybrid between a FLMB and a NLMB. Genetic composition was determined by micro-satellite DNA analysis.

Year	Sample size	Number of fish			% FLMB alleles	% FLMB
		FLMB	Intergrade	NLMB		
2005	55	1	54	0	65.4	2.0
2009	30	0	30	0	62.0	0.0
2013	30	2	28	0	59.0	7.0

Crappies

Table 11. Creel survey statistics for crappies at Martin Creek Reservoir from February through April 2002, December 2009 through February 2010, and December 2013 through February 2014. Total catch per hour is for anglers targeting crappies and total harvest is the estimated number of crappies harvested by all anglers. Relative standard errors (RSE) are in parentheses.

Creel survey statistic	2002	2009/2010	2013/2014
Directed effort (h)	5,933.6 (35.46)	1,201.7 (46)	140.5 (115)
Directed effort/acre	1.1 (35.46)	0.2 (46)	0.03 (115)
Total catch per hour	0.8 (56)	0.0	0.8
Total harvest	5,044.9 (109)	0.0	69.0 (220)
Harvest/acre	1.0 (109)	0.0	0.01 (220)
Percent legal released	0.0	0.0	0.0

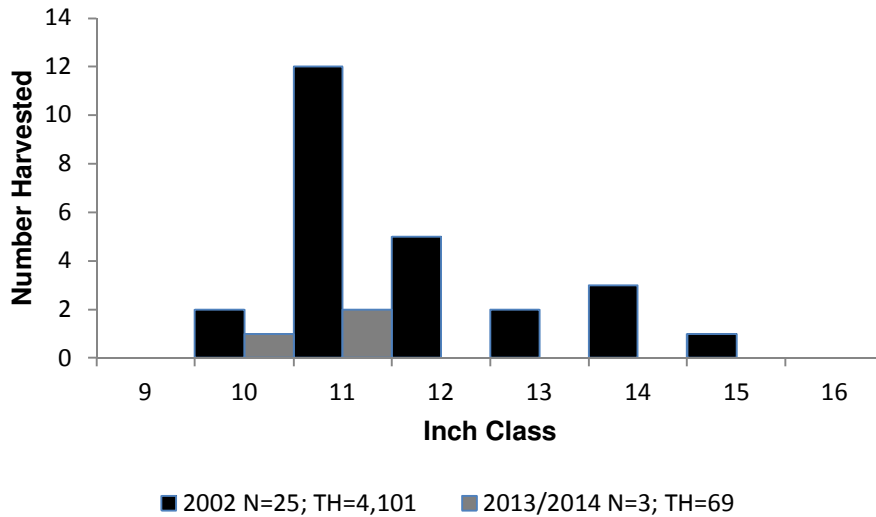


Figure 11. Length frequency of harvested Black Crappie observed during creel surveys at Martin Creek Reservoir, Texas, February to April 2002, and December 2013 through February 2014, all anglers combined. N is the number of harvested Black Crappie observed during creel surveys, and TH is the total estimated harvest for the creel period.

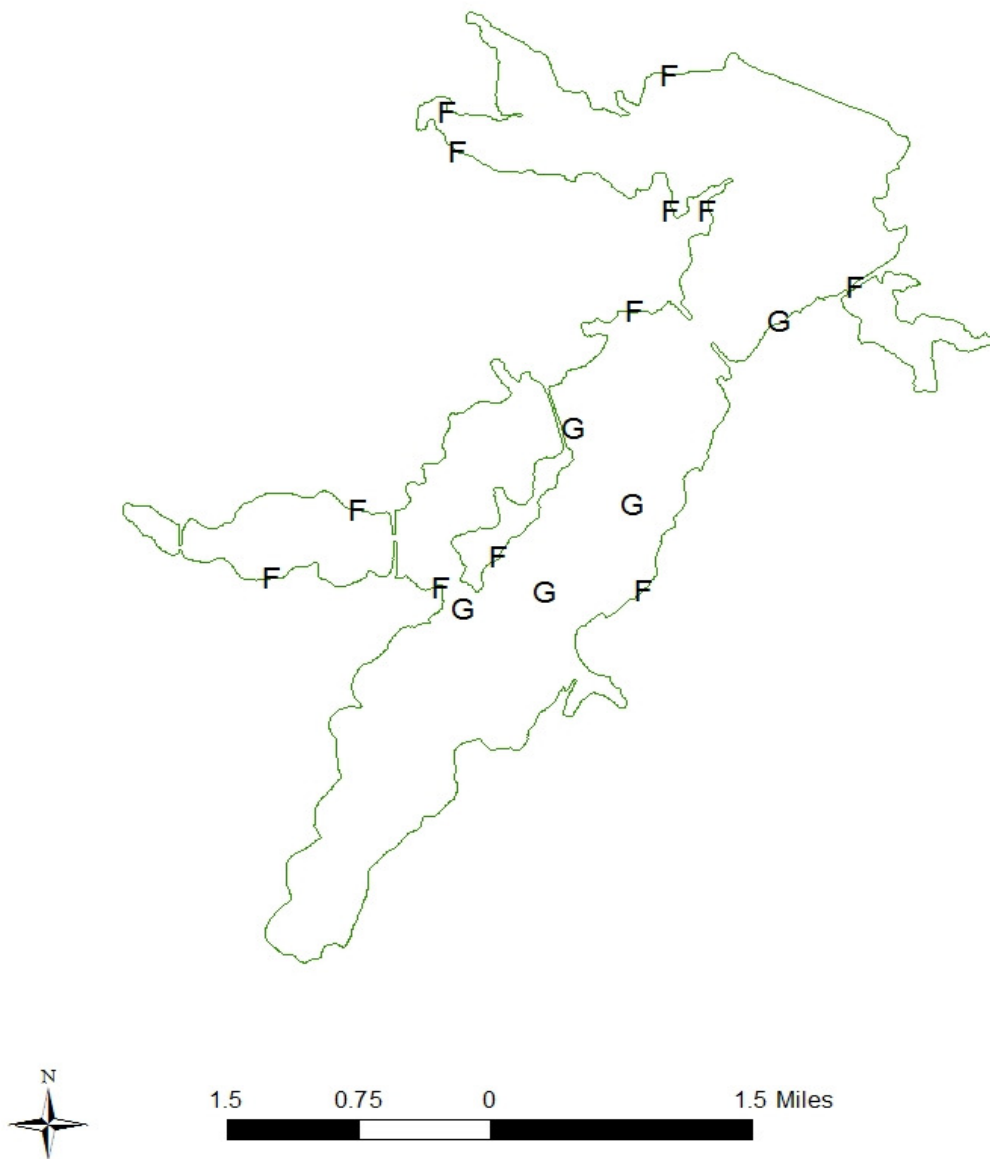
Table 12. Proposed sampling schedule for Martin Creek Reservoir, Texas. Survey period is June through May. Gill netting surveys are conducted in the spring, while electrofishing and trap netting surveys are conducted in the fall. Standard survey denoted by S and additional survey denoted by A.

Survey year	Electrofishing Fall(Spring)	Gill net	Vegetation	Access	Creel survey	Report
2014-2015			A			
2015-2016			A			
2016-2017			A			
2017-2018	S	S	S	S	A	S

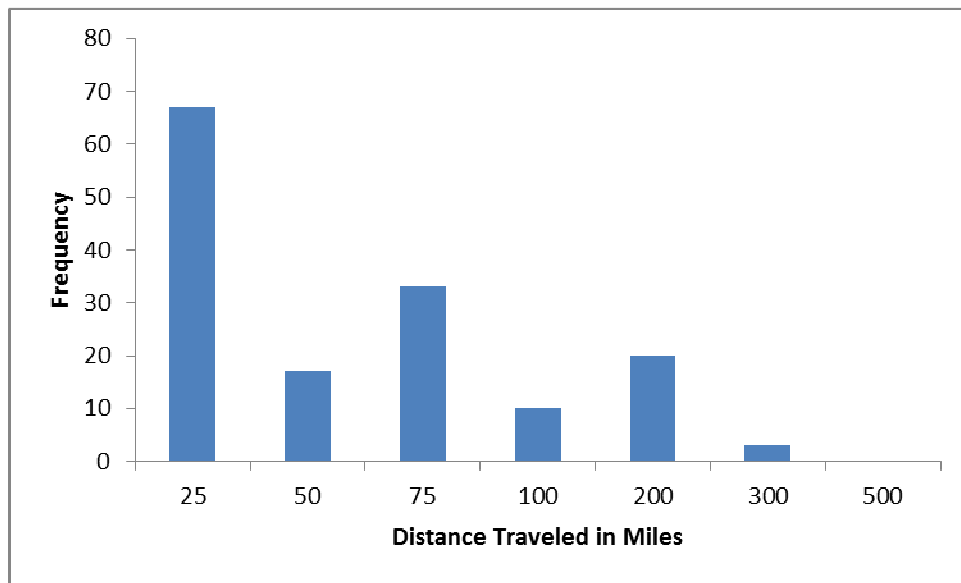
APPENDIX A

Number (N) and catch rate (CPUE) of target species collected from gill netting and fall electrofishing, Martin Creek Reservoir, Texas, 2013-2014. Sampling effort was 5 net nights for gill netting and 1 hour for electrofishing.

Species	Gill Netting		Fall Electrofishing	
	N	CPUE	N	CPUE
Gizzard Shad	18	3.6	31	31.0
Threadfin Shad			35	35.0
Blue Catfish	104	20.8		
Channel Catfish	50	10.0		
Redbreast Sunfish			10	10.0
Bluegill			423	423.0
Redear Sunfish			4	4.0
Largemouth Bass			183	183.0

APPENDIX B

Location of sampling sites, Martin Creek Reservoir, Texas, 2013-2014. Gill net and electrofishing stations are indicated by G and F, respectively. Water level was near full pool at time of sampling.

APPENDIX C

Frequency of anglers that traveled various distances (miles) to Martin Creek Reservoir, Texas, as determined from the December 2013 through February 2014 creel survey.